

Name _____

9-3B Lesson Master**Questions on SPUR Objectives**

See Student Edition pages 656–659 for objectives.

VOCABULARY1. Consider the number $e = 2.718281828459045235360287\dots$

a. After whom was it named? _____

b. Approximate its value to the nearest thousandth. _____

c. Since e is an irrational number, there is no sequence of digits that repeats forever, but explain why it is relatively easy to remember e rounded to billionths (9 decimal places).
_____d. **Fill in the Blank** For an integer n , as n increases, the sequence of numbers _____ approaches e .

2. Evaluate to the nearest thousandth.

a. $e^{-5} \approx$ _____

b. $e^{7.2} \approx$ _____

c. $e^{2.03} \approx$ _____

d. $e^{-0.004} \approx$ _____

PROPERTIES Objective D3. **Multiple Choice** Which situation does the function defined by $y = 5e^{2+x}$ describe? _____

A constant increase

B exponential growth

C constant decrease

D exponential decay

4. Give the domain and range of $y = 5e^{2+x}$.

domain _____ range _____

Multiple Choice In 5–12, which situation is described by the function?

A constant increase

B exponential growth

C constant decrease

D exponential decay

5. $f(x) = e^{-5x}$ _____

6. $g(x) = 5ex$ _____

7. $h(x) = -2ex + 1$ _____

8. $u(x) = 4e^x$ _____

9. $v(x) = e^{8x}$ _____

10. $w(x) = e^{0.5x}$ _____

11. $a(x) = e^{-0.9x}$ _____

12. $m(x) = 3ex - 4$ _____

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USES Objective G

13. Suppose an initial amount of \$20,000 grows at the rate of 13% per year. Use function notation to describe this continuous-change model. _____

14. Suppose \$1800 is invested at an annual interest rate of 7% compounded continuously, and the money is left untouched.

a. How much is in the account after 5 years? _____

b. How much is in the account after 10 years? _____

c. Find the effective annual yield on the account. _____

In 15–17, it is predicted that a new car costing \$35,000 will depreciate at a rate of 11% per year. Determine about how much the car will be worth in the given number of years.

15. 5 years _____ 16. 10 years _____ 17. 15 years _____

18. A machine depreciates so that its value after t years is given by $N(t) = N_0e^{-0.18t}$.

a. What is the annual rate of depreciation of the machine? _____

b. If after 5 years the machine is worth \$16,000, what was its original value? _____

19. Suppose the accident rate in Julian County is continually decreasing at an annual rate of 3%.

a. If there were 5706 accidents this year, write a function to give the number of accidents in t years. _____

b. Estimate the number of accidents 10 years from now. _____

20. The amount L of Radium-226 (^{226}Ra) remaining after t years decreases according to the formula $L = Be^{-0.000428t}$. If 500 micrograms of ^{226}Ra are left after 8000 years, how many micrograms were present initially? _____

21. If you assume a constant inflation rate of 3.44% per year, then the value V of a dollar n years from now can be modeled by the equation $V = e^{-0.0344n}$. According to this model, what will be the value of the dollar 10 years from now? _____